

Are Humans too Numerous to Become Extinct?

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He who refuses to learn deserves extinction.

Rabbi Hillel

Birth and death are so closely related that one could not destroy either without destroying the other at the same time. It is extinction that makes creation possible.

Samuel Butler

We have no notion when our environmental indebtedness will bring even greater ruin, only that it is likely to happen.

James Lovelock

I think the average man would rather face death or torture than think.

Bertrand Russell

Most of them are doomed to rapid extinction, but a few may make evolutionary inventions, such as physiological, ecological, or behavioral innovations that give these species improved competitive potential.

Ernst Mayr

Overview

When I hear or read that humans are too numerous to become extinct, I think of passenger pigeons that were once probably the most numerous bird on Earth, but which are now extinct. They lived “in the billion or so acres of primary forest that once covered North America east of the Rocky Mountains. Their flocks, a mile wide and up to 300 miles long, were so dense that they darkened the sky for hours and days as the flock passed overhead. . . . Total populations may have reached 5 billion individuals and comprised up to 40% of the total number of birds in North America” (Schorger 1955). Loss of habitat and over hunting doomed this abundant species in just a few decades. Humankind is damaging its habitat, discharging endocrine disruptors and other toxic chemicals into the environment, having deleterious effects on agricultural productivity due to climate change, and is always vulnerable to a pandemic disease. The thought of protection by huge population size is delusory!

Barnosky (2009) discusses extinction of species as a consequence of anthropogenic changes and the resultant lack of an area that would qualify as a nature preserve. This situation means that all species, including *Homo sapiens*, will survive only if they are pre-adapted to tolerate the new conditions or adapt rapidly to them.

Future Rate of Climate Change

Rajendra Pachauri, chief of the Intergovernmental Panel on Climate Change (IPCC), has noted that the leaders at the recent G-8 meeting in Italy “failed to heed warnings that global greenhouse gas emissions levels must peak by 2015” (Gronewold 2009). In short, to limit the temperature increase to 2°C will require immediate action. Barnosky (2009, p. 196) echoes this mandate:

Simply slowing down the train, however, does not change the reality that major ecological changes have already been set in motion, which, like it or not, will continue to gather momentum at least for several decades as the Age of Global Warming unfolds. And as those changes proceed, we inevitably face the prospect of transforming nature itself into something we hardly recognize – not only by degrading ecosystem services globally and losing certain species in particular ecological preserves, but also by losing wilderness, either by neglect or design. If that happens, we lose connection with the wilderness world in which we became human.

The preponderance of evidence on global heating clearly indicates that anthropogenic greenhouse gases are a major forcing factor, but the world's politicians seem incapable of crafting quantitative and temporal goals to reduce substantively the formidable risks. Politicians are treating science as a peripheral policy concern (BBC News 2009). For example, approval by the US Congress of the Waxman-Markey climate change bill is being regarded as a remarkable political achievement, but the bill does not "impose any performance standards on existing power plants. And it explicitly removes these plants from the reach of the Clean Air Act" (Editorial 2009). If *Homo sapiens* cannot get its act together, extinction becomes increasingly probable.

Climate changes are essentially irreversible in time frames of interest to humans. However, humankind can, and should, take immediate action to prevent the crisis from worsening. For example, anthropogenic greenhouse gas emissions should peak by 2015 or sooner. In addition, ecological changes already set in motion will continue – ecological time is different from human time frames. Increasing human demand for fossil energy is due to exponential population growth and increased per capita consumption of both energy and resources. The new Chinese policy of having more children worsens the problem by increasing total numbers and endorsing perpetual population growth. For example, "Shanghai is urging eligible couples to have two children as worries about the looming liability of an ageing population outweighs concerns about over-stretched resources . . . The policy marks the first time in decades Chinese officials have actively encouraged procreation" (Reuters 2009). Actually, having more children to solve the problem of the looming liability of an ageing population is really a population Ponzi scheme. Overpopulation is already a global problem and China's new policy will only exacerbate it. Of course, the default position is to do nothing and let Mother Nature reduce the global population to fit global carrying capacity with her usual methods – starvation, disease, and death. This default position does not sound like a plan that will be successful in avoiding extinction.

Preparing to be a Survivor

Charles Darwin emphasized natural selection and survival of the fittest. Consequently, humankind should be preparing for a vastly different environment on planet Earth. The situation will be especially trying if the temperature increase is 3, 4, or 5°C. These increases will make Earth an alien planet to humans. The present "business as usual" practices will essentially continue for another year, perhaps two, so that getting a global climate increase of 3, 4, 5, or 6°C is more than a remote possibility.

Climate change, including both increased temperature and substantially altered rainfall patterns, is already happening even though the global temperature increase is still just under 2°C. Water shortages already exist worldwide and are not being coped with effectively. The "wild card" in climate change is the positive feedback loops such as the greenhouse gases that are released when the permafrost melts or the frozen hydrated methane on the ocean floor thaws. If this situation worsens, as it probably will, global heating will speed up markedly. A previously underestimated positive feedback loop (i.e., a positive or amplifying feedback) is low cloud cover. "The first reliable analysis of cloud behavior over past decades suggests – but falls short of proving – that clouds are strongly amplifying the warming" (Kerr 2009). This factor makes preparing to be a survivor of global climate change even more difficult.

Probable Causes of Extinction

Stochastic events such as an active "super volcano" are difficult to avoid, but the present probability of driving *Homo sapiens* to extinction depends on all the activities to which humans are addicted.

(1) *Economic growth* – Until recently, the metric most commonly used to describe churches, towns, industries, or nations has been growth rate. Some growth rates, such as intellectual growth, do not use resources as intensively as material growth. "In the early 1980s, around the time Ronald Regan became president and Wall Street's great modern bull market began, we started gambling (and winning!) and thinking magically. From 1980 to 2007, the median price of a new American home quadrupled. The Dow Jones industrial average climbed from 803 in the summer of 1982 to 14,165 in the fall of 2007. From the beginning of the '80s through 2007, the share of disposable income that each household spent servicing its mortgage and consumer debt increased 35%. Back in 1982, the average household saved 11% of its disposable income. By 2007 that number was less than 1%" (Anderson 2009).

Some oxymorons – such as *sustainable growth* and *smart growth* – have been coined that delude humans into thinking that perpetual growth is possible on a finite planet. When the global financial meltdown occurred, society anguished over the fact that no one saw the crisis coming sooner. The primary goal at present seems to be restoring the economy, which means returning to the way things were. Much rhetoric has been forthcoming on this goal, but with few substantive ideas. Maher (2009) states: "How about this for a New Rule: Not everything in America has to make a profit. It used to be that there were some services and institutions so vital to our nation that they were exempt from market pressures. Some things we just didn't do for money. The United States always defined capitalism, but it didn't used to define us. But now it's becoming all that we are."

(2) *Addiction to Fossil Fuel, Particularly Petroleum* – Cheap, abundant fossil fuel, particularly petroleum, has given *Homo sapiens* more energy than any other species has ever had. It gave humans the illusion that they controlled nature, and it changed the culture in a variety of ways, including the location of houses. However, petroleum has also damaged the environment, including the climate. The preponderance of scientific evidence showing that humans are changing the climate has not changed their behavior significantly, although the global financial meltdown has – at least temporarily.

(3) *Over Consumption* – Cheap energy made possible the manufacture of cornucopian supplies of material goods and food. Now, society has lots of stuff, more obese people, and ecological overshoot.

(4) *Overpopulation* – If any other species on the planet had exponential growth comparable to humankind's growth, a pesticide would be used immediately. However, the perpetual growth delusion views more people as more consumers. Concepts such as carrying capacity or limits to growth are rarely mentioned. Ecological overshoot is the result of both over consumption and overpopulation, but the common viewpoint is "best not to think about those things."

(5) *Ocean Acidification* – Albert Einstein thought the oceans were too big to be affected adversely by humans – they cover about 70% of Earth's surface. However, acidification already has caused serious ecological problems. The culprit is carbon dioxide, which is also a major factor in global heating. Oceanic fisheries are already in deep trouble because of excessive harvesting of fish. The planet's human population of nearly 7 billion has already adversely affected oceanic fisheries management, and the expected 2 billion additional people by 2050 will certainly exacerbate the present precarious situation. The adverse ecological effects of ocean acidification will make the human condition precarious for centuries – possibly longer.

(6) *Toxicants* – Toxic chemical substances are already ubiquitous, and many are persistent. Endocrine disruptors have become a cause for major concern, and much can still be learned about them. Persuasive evidence indicates that they already affect human health and well being, and they could easily be a factor in the survival of the human species. The toxicological problems are so complex that decades will probably be needed to establish all the risks involved.

Conclusions

If humankind wishes to avoid extinction, massive preparations must begin at once. Extinction would be the ultimate irony because the crises leading to extinction were of human origin and, thus, at least initially, under human control. Worse yet, science has described and is describing the consequences of an unsustainable lifestyle. One of humankind's most mindless actions is to deny the evidence provided by science. Of course, the computer models are not perfect, but no precedents were available for the global changes now unfolding. The evidence that things were moving more rapidly than predicted should have been taken seriously. Part of the problem was the well funded global heating deniers. All the National Academies of Science, or their counterparts, confirmed that anthropogenic greenhouse gas emissions were a major factor in global heating. The preponderance of scientific evidence supported this conclusion. However, global heating deniers are still a potent force in the US Congress and elsewhere.

Of course, scientific evidence should not be needed for an awareness of either over consumption or overpopulation and the fact that humankind is not doing enough to abate them. As far as is known now, Earth is the only planet with conditions favorable for humans and for many of the species with which they share the planet. How can humankind be so indifferent to the dangers confronting it – dangers that could lead to extinction? Humans do not seem to realize that they are endangering, possibly eliminating, the future of posterity – to state it bluntly, humans are stealing the future from their children, grandchildren, and great grandchildren.

The extinction of *Homo sapiens* is no longer just possible – it is now probable. Estimates are that as many as 99% of all species that ever lived on Earth are now extinct, so extinction is a normal process. Time for remedial action to prevent human extinction is running short, and some scientists believe the human species has already passed the point of no return.

Until recently, I believed that hunter/gatherers might be able to adjust to climate change. However, Rosenthal (2009) describes the plight of the Kamayurá tribe in the Zingu National Park in Brazil: "Deforestation and, some scientists contend, global climate change are . . . decimating fish stocks in this area," which is the primary source of protein for the Kamayurá. The Kamayurá could become environmental refugees since climate and other global changes are rapid, large, and seemingly unstoppable as long as humankind continues business as usual. "Cultures threatened by climate change span the globe" (Rosenthal 2009).

Although extinction has been the norm for species for the past 4 billion years, humans are convinced that they are exempt from this process. However, Darwin's "dice" and Mother Nature are continually selecting new species more suited to the new environment. In the United States, the global crises are not discussed in depth very frequently. Issues such as overpopulation and over consumption are rarely discussed in depth. How does Darwin's "survival of the fittest" relate to the present attitudes and preoccupations of humankind?

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LITERATURE CITED

- Barnosky, A. D. 2009. *Heatstroke: Nature in an Age of Global Warming*. Island Press, Sheerwater Books, Washington, D. C.
- BBC News Online. 2009. Scientists 'kept at arm's length.' 23July
<http://news.bbc.co.uk/1/hi/news/8164000/8164383.stm>.
- Editorial. 2009. Climate loopholes. New York Times 22July
<http://www.nytimes.com/2009/07/22/opinion/22wed11.html>.
- Gronewold, N. 2009. IPCC chief raps G-8, calls for global greenhouse gas emissions cut after 2015. New York Times and E Publishing, Climate Wire 21July <http://www.nytimes.com/cwire/2009/07/21/21climatewire-ipcc-chief-raps-g-8-calls-for-global-greenho-41901.html>.
- Kerr, R. A. 2009. Clouds appear to be big bad player in global warming. *Science* 325(5939):376.
- Maher, B. 2009. New rule: not everything in America has to make a profit. Huffington Post 23July
http://www.huffingtonpost.com/bill-maher/new-rule-not-everything-i_b_244050.html.
- Reuters. 2009. China promoting 2-child families. 24July
<http://www.nytimes.com/reuters/2009/07/24/world/international-china-babies.html>.
- Rosenthal, E. 2009. An Amazon culture withers as food dries up. New York Times 25July
<http://www.nytimes.com/2009/07/25/science/earth/25tribe.html>.
- Schorger, A. W. 1955. *The Passenger Pigeon*. University of Wisconsin Press, Madison, WI.